

# GAGAN (GPS Aided GEO Augmented Navigation)

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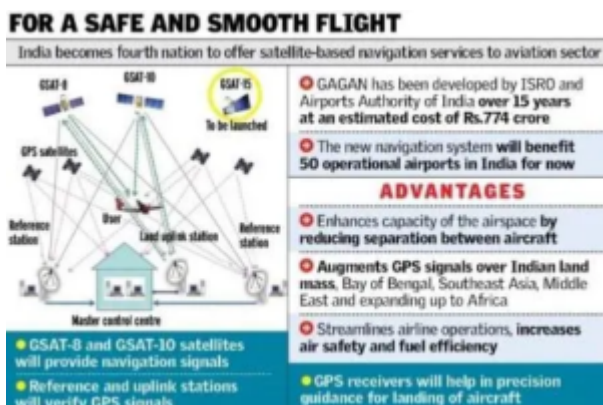
**In news-** In a first, an IndiGo-operated ATR 72-600 aircraft recently landed at Kishangarh airport, using an approach process guided by India's own satellite-based augmentation system named GAGAN, or GPS-aided GEO Augmented Navigation.

## **Key updates-**

- With this trial landing at the small airport near Ajmer in Rajasthan, **India joined a small group comprising the US, Japan and Europe with its own satellite-based augmentation system (SBAS).**
- Other than GAGAN, the **three space-based augmentation systems in the world are– US (WAAS) Europe (EGNOS) and Japan (MSAS).**
- With ISRO's GAGAN, **India has become the first country in the Asia-Pacific to successfully develop such a system for aviation use.**
- The others under development include *China's BeiDou SBAS, South Korea's Korea Augmentation Satellite System (KASS), Russia's System for Differential Corrections and Monitoring (SDCM), and the Southern Positioning Augmentation Network (SPAN) of Australia and New Zealand.*
- **The SBAS is a navigation system, which builds on the Global Navigation Satellite Systems (GLONASS),** and adds to the accuracy and integrity of these navigation tools.
- For aircraft operators, both civilian and military, **it means that pilots can land aircraft at smaller airports and airstrips using navigation guidance** without expensive instrument-based landing systems being installed on the ground.

## About GAGAN-

- **GAGAN is an Indian Satellite Based Augmentation System (SBAS).**
- This system has been **developed by the AAI and the ISRO.**
- **It uses a constellation of satellites** and a network of ground stations (**in Delhi, Guwahati, Kolkata, Ahmedabad, Thiruvananthapuram, Bengaluru, Jammu and Port Blair**) to provide necessary augmentations to the GPS standard positioning service (SPS) navigation signal for use in air traffic management.
- The ground stations strategically positioned across the country are used to collect GPS satellite data on aircraft position and movement.
- **GAGAN is designed to provide accuracy and integrity necessary to enable reliance on GPS** for all phases of flight from en route through approach, for all qualified airports within the covered zone.
- It will also provide **increased accuracy in position reporting of aircraft**, allowing for more uniform and high-quality air traffic management.



- It offers almost the same accuracy as a ground-based landing system comprising antennae and beacons that transmit signals to aircraft to help pilots land.
- It will enable aircraft to land even at smaller and regional airports not equipped with expensive ground-based landing systems.

- **GAGAN can bring benefits in terms of saving fuel and equipment cost, flight safety,** especially in adverse weather conditions and increased air space capacity, according to Isro.
- Its footprint extends from Africa to Australia and has expansion capability for seamless navigation services across the region.
- Though primarily meant for aviation, **GAGAN will provide benefits to many other user segments such as intelligent transportation, maritime, highways, railways,** surveying, geodesy, security agencies, telecom industry, personal users of position location applications etc.
- **AAI in coordination with Indian National Centre for Ocean Information Services (INCOIS) has implemented GAGAN Message Service (GMS) through which alert messages to fishermen, farmers,** and disaster affected people will be sent on the occurrence of natural disasters, calamities, such as flood, earthquake etc.